

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date
3 June 2004 (03.06.2004)

PCT

(10) International Publication Number
WO 2004/045831 A1

(51) International Patent Classification⁷: B29C 49/74, B26D 3/16

(21) International Application Number:
PCT/IB2003/004857

(22) International Filing Date: 30 October 2003 (30.10.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
P-200202760 15 November 2002 (15.11.2002) ES

(71) Applicant (for all designated States except US): CONSTRUCCIONES MECANICAS MAER, S.A. [ES/ES]; C. La Selva, 2., Pol. Ind. Massanes, E-17452 Massanes (ES).

(72) Inventors; and

(75) Inventors/Applicants (for US only): VIDAL CAUPENA, Jordi [ES/ES]; La Selva, 2, E-17452 Massanes (ES). MACH GUIRADO, Juan [ES/ES]; La Selva, 2, E-17452 Massanes (ES).

(74) Agents: PONTI SALES, Adelaida et al.; C. de Consell de Cent, 322, E-08007 Barcelona (ES).

(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

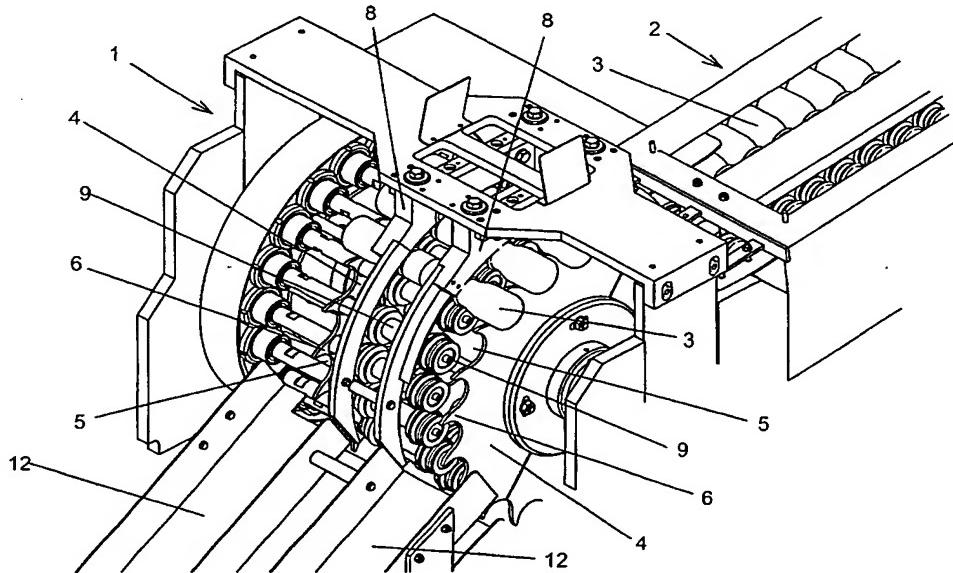
(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— as to the identity of the inventor (Rule 4.17(i)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU,

[Continued on next page]

(54) Title: HORIZONTAL CUTTER OF DOUBLE-BODIED BOTTLES ATTACHED TO EACH OTHER AT THE NECK



WO 2004/045831 A1

(57) Abstract: It comprises means (2) for advancing the bottles (3) and a cutting device (1) of the neck of the bottles. It is characterised in that said cutting device (1) comprises a pair of blades (7), a pair of rotating plates (4) for drawing the bottles (3), along and a plurality of drive pulleys (9) in contact with the bottles (3), in such a way that as the rotating plates (4) move so too do the bottles, at the same time rotating about their axes and in contact with the blades. These characteristics ensure fast and effective cutting to the bottles, while the cutting device occupies little space.



ZA, ZM, ZW, ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN,

TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

- of inventorship (Rule 4.17(iv)) for US only

Published:

- with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

HORIZONTAL CUTTER OF DOUBLE-BODIED BOTTLES ATTACHED
TO EACH OTHER AT THE NECK

This invention relates to a horizontal cutter of
5 double-bodied bottles attached to each other at the neck.

BACKGROUND OF THE INVENTION

Known in the art are horizontal cutting machines
10 whose purpose is to provide two new single bottles by
separating the two bodies of a double-bodied bottle
manufactured previously by means of blowing, extrusion or
other shaping methods.

On such machines the bottles reach a cutting station
15 in horizontal position by means of a conveyor belt with
dividing segments and an end ramp. As the cut is made the
bottles move along resting on a pair of tracks. A drive
belt situated above the tracks makes contact with the
upper part of the bottle, making it advance and rotate
20 about its own axis. As the bottle advances a fixed blade
located between the two tracks and gradually increasing
their height performs the cut. Thanks to the bottle
shifting and rotation movement the cut is made around the
entire perimeter of the neck. When the cut is completed,
25 the two bottles and the central attaching part are
ejected.

These machines have the disadvantage that the
rotation of the bottles becomes imprecise as their passing
speed increases, since the rotation resistance caused by
30 the cutting action of the blade disturbs the bottle's
travel-path, in which the bottle has only one point of

contact with the support tracks and another with the drive belt. Furthermore, in order to implement the cutting of the bottles there has to be a certain space between them, since the bottle has to be able to rotate freely as the 5 cut is being made, with no means other than the tracks and the drive belt in contact with it. All these factors have an adverse effect on productivity, as the bottles often fall over or their path deviates at the cut is made. Moreover, the limited cutting speed and the space that has 10 to be left between one bottle and the next also reduces the output of the system.

This system further requires the cut to be made in a straight line, so that the machine takes up a considerable amount of space.

15 In order to resolve these disadvantages a choice has sometimes been made in favour of heating the blade so that the plastic material of the bottles melts as the cut is being made. This achieves reduced friction between the blade and the bottle, and the cut can be made faster. 20 After the cut, however, and due to the melting of the material carried out by the blade, the bottles have a burr at the mouth that subsequently has to be removed, which involves increased costs and extra manufacturing time.

25

DESCRIPTION OF THE INVENTION

The objective of this invention is to resolve the disadvantages of the devices known in the prior art, while further providing additional advantages that will become 30 clear from the description that follows.

The horizontal cutter of the invention for double-bodied bottles attached to each other at the neck is of the type that comprises means of advancing the bottles and a bottle-neck cutting device, and is characterised in that 5 said cutting device comprises a pair of blades, a pair of rotating plates for drawing the bottles along and a plurality of drive pulleys in contact with the bottles, so that as the rotating plates move so too do the bottles, at the same time rotating about their axes and in contact 10 with the blades.

Thanks to these characteristics the bottles are made to move and to rotate about their own axes, this facilitating and speeding up the cutting operation.

Moreover, unlike other machines, the bottles follow a 15 circular route and not a straight-line path at the time of the cut, which means that the space occupied by the cutting device is reduced substantially.

According to one embodiment of this invention, the profile of the drive pulleys and of the blade carriers is 20 complementary to that of the necks of the bottles.

The bottles are thus guided by the blade carriers, rendering impossible any deviation or falling of the bottles that could cause a stoppage or fault in production, while also improving the precision of the cut.

25 According to another embodiment of this invention the rotating plates comprise a plurality of perimetral housings for the bottles.

These housings allow the bottles to be well-positioned throughout the cutting operation.

30 Advantageously, the cutting machine comprises a pressurised air conveyor for moving the bottles,

characterised in that this conveyor comprises a guide provided with two lower rails and two upper rails which are in contact with the bottom of grooves in the bottle necks.

5 The feed of bottles is implemented effectively and speedily, for thanks to this system the bottles arrive at the device in a row, well-positioned and in contact with each other, thus optimising space and avoiding empty spaces or bottle-jams due to the deviation of any bottle.

10 In one embodiment, the housings are separated by spoon-shaped teeth in order to facilitate positioning of the bottles inside said housings.

15 This particular shape of the teeth facilitates bottle pick-up at and ejection of the bottles at the inlet and outlet of the cutting device.

In another embodiment, the machine comprises at the cutting device outlet section three ramps, two of which gather the two cut bottles while the third gathers the intermediate dome resulting from the cut.

20 Ejection and separation of the bottles is thus carried out quickly and effectively.

BRIEF DESCRIPTION OF THE DRAWINGS

25 In order to assist the description of all that has been outlined above some drawings are attached which show schematically and solely by way of non-restrictive example a practical case of embodiment of the cutting machine of the invention. In the drawings:

30 Figure 1 is a perspective view of the machine of the invention;

Figure 2 is a side elevation view of the machine of the invention, showing the bottle cutting process;

Figure 3 is a detail of the interior of the pressurised air conveyor and the arrangement of the 5 bottles therein;

Figure 4 is a detail view of the guiding of the bottles by the pulleys; and

Figure 5 is a general view of the pulleys, the blades and their carriers and the bottle at the time the cut is 10 made.

DESCRIPTION OF A PREFERRED EMBODIMENT

As Figures 1 and 2 show, the cutting device 1 is fed 15 by a pressurised air conveyor 2 which causes the bottles 3 to arrive in a row and presses them against one another.

A pair of rotating plates 4 that have a number of housings 5 around their perimeter gather up the bottles 3 from the conveyor. The spoon-shaped layout of the teeth 6 20 between the housings 5 prevents possible falling over of the bottles 3 during the transfer between the conveyor 2 and the plates 4.

Once the bottles 3 are in the housings 5 the rotating movement of the plates 4 begins to move them towards the 25 blades 7 attached to their carriers 8.

At the same time, some drive pulleys 9 ensure that the bottles 3 also rotate about their own axes. Each bottle 3 is in contact with two pulleys 9, which press them against the blades 7, in such a way that the cut is 30 made around the entire outline of the neck of the bottle 3.

Once the bottle's 3 neck has been cut, the two new bottles 10 resulting from the process, and the intermediate dome 11 left over drop off the plate 4 thanks to the shape of the teeth 6 and the bottles are then 5 separated by means of ramps, two for the new bottles 10 and one for the intermediate domes 11.

With this system the passage between the plate 10 housings is brought closer to the diameter of the bottles, thereby achieving housing of the largest possible number of bottles.

There follows a description of the process each bottle follows for its cutting, as well as a more detailed description of the means that take part in the process.

As noted above, the bottles 3 are fed by means of a 15 pressurised air conveyor 2, in a row and in contact with each other. Figure 3 shows a section of the conveyor 2 and the arrangement of the bottle 3 inside it.

The bottle 3 travels along a guide 13 provided with two lower tracks 15 and another two upper tracks 15 which 20 are in contact with the bottom of the grooves on the neck of the bottle 3. The intermediate dome 11 is placed inside the guide 13.

By means of pressurised air that circulates inside the conveyor 2 the bottle is pushed towards the cutting 25 station. This guiding ensures that the bottle 3 cannot fall from the conveyor 2 and ensures precise positioning when it reaches the cutting device 1.

When the bottle reaches the cutting device 1, the bottles passes to a housing 5 made for the purpose in the 30 rotating plates 4 which move its towards the blades 7.

The bottle 3 is also in contact with two drive pulleys 9 whose profile complements that of the bottle 3 and also imparts a rotation movement to the latter.

Figure 5 shows the fit between the two pulleys 9 and 5 the bottle 3.

As Figure 5 shows, the cutting of the bottle 3 neck is made by the combined action of the plates (not shown), the pulleys 9 and the blades 7. The bottle 3 travels the length of the blades and is at the same time pressed 10 against them by the two pulleys 9. Thanks to the rotating movement imparted by the pulleys 9, the cut is made more quickly.

The blade 7 carriers 8 also have a profile that complements that of the bottle 3, so that bottle 3 guiding 15 is perfect, without any kind of oscillation or deviation. Each bottle 3 is thus secured by three elements and six points of contact, so that cutting is secure and can be carried out at high speed.

Once the bottle 3 has been cut, it continues to be 20 guided by the pulleys 9 and the blade 7 carriers 8 as far as the end of the guides of the blade 7 carriers 8.

As they are no longer supported, the two bottles 10 resulting from the cut fall onto two ramps 12, while the intermediate dome 11 left over falls onto another ramp 12.

Independent of the object of this invention are the materials used for manufacturing the parts of the horizontal cutter of double-bodied bottles attached to each other at the neck as described herein, as are the shapes and dimensions thereof and all accessory details 25 30 that might be presented, which can be replaced by others that are technically equivalent, as long as they do not

affect its essential nature nor depart from the sphere defined by the claims attached below.

CLAIMS

1. Machine for the cutting of double-bodied bottles attached to each other at the neck, which comprises means
5 (2) for advancing the bottles (3) and a bottle-neck cutting device, characterised in that said cutting device (1) comprises a pair of blades, a pair of rotating plates (4) for drawing the bottles (3) along and a plurality of drive pulleys (9) in contact with the bottles (3), so that
10 as the rotating plates (4) move so too do the bottles (3), at the same time rotating about their axes and in contact with the blades (7).

2. Machine, according to Claim 1, characterised in
15 that the profile of the drive pulleys (9) and of the blade (7) carriers (8) is complementary to that of the necks of the bottles (3).

3. Machine, according to Claim 1, characterised in
20 that the rotating plates (4) comprise a plurality of perimetral housings (5) for the bottles (3).

4. Machine, according to Claim 1, that comprises a pressurised air conveyor (2) for moving the bottles (3),
25 characterised in that this conveyor (2) comprises a guide (13) provided with two lower rails (14) and two upper rails (15) which are in contact with the bottom of grooves in the bottle necks.

30 5. Machine, according to Claim 3, characterised in that the housings (5) are separated by spoon-shaped teeth

10

(6) in order to facilitate positioning of the bottles (3) inside said housings (5).

6. Machine, according to Claim 1, characterised in
5 that it comprises at the cutting device (1) outlet section
three ramps (12), two of which gather the two cut bottles
(10) while the third gathers the intermediate dome (11)
resulting from the cut.

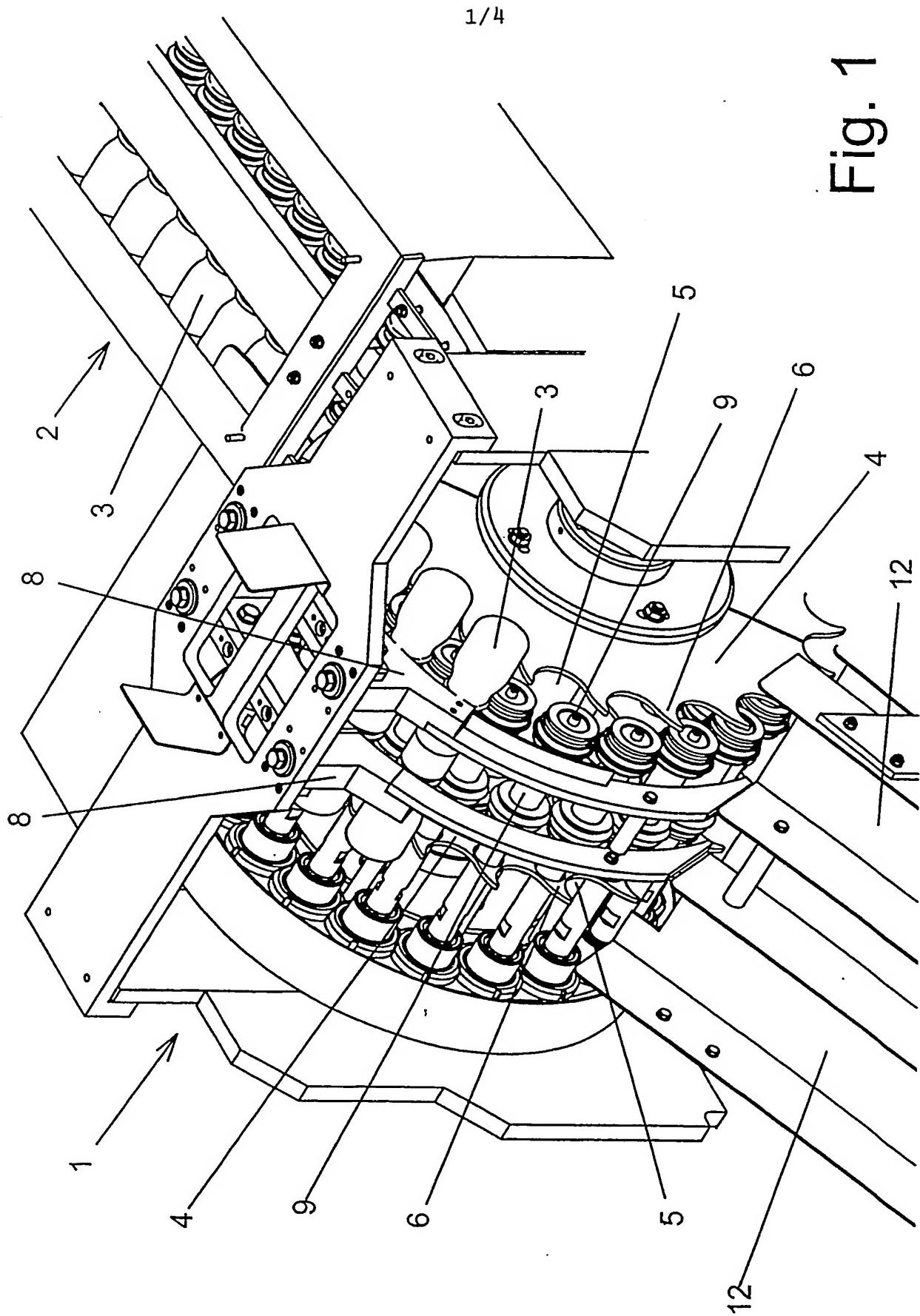


Fig. 1

2/4

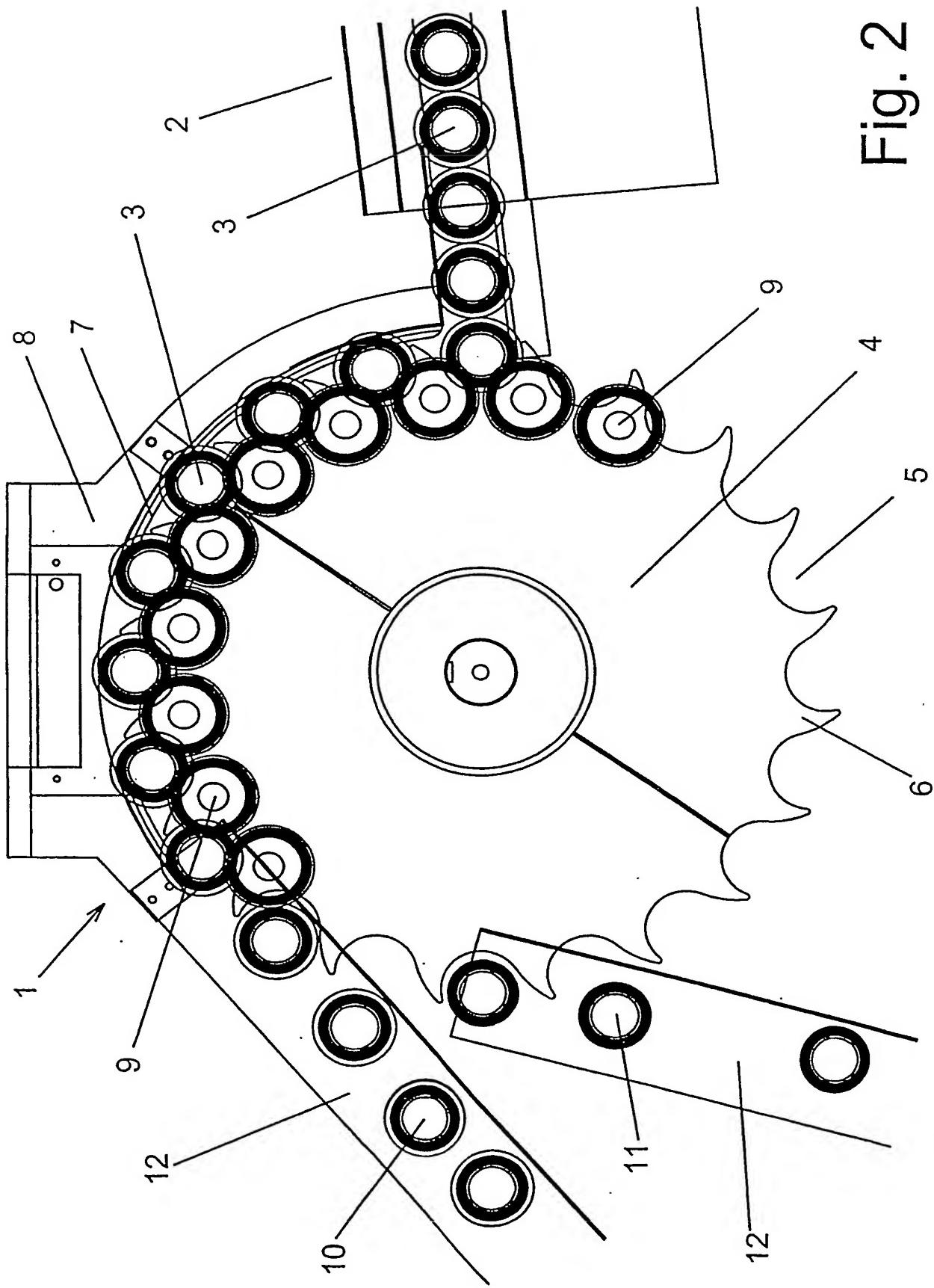


Fig. 2

Fig. 3

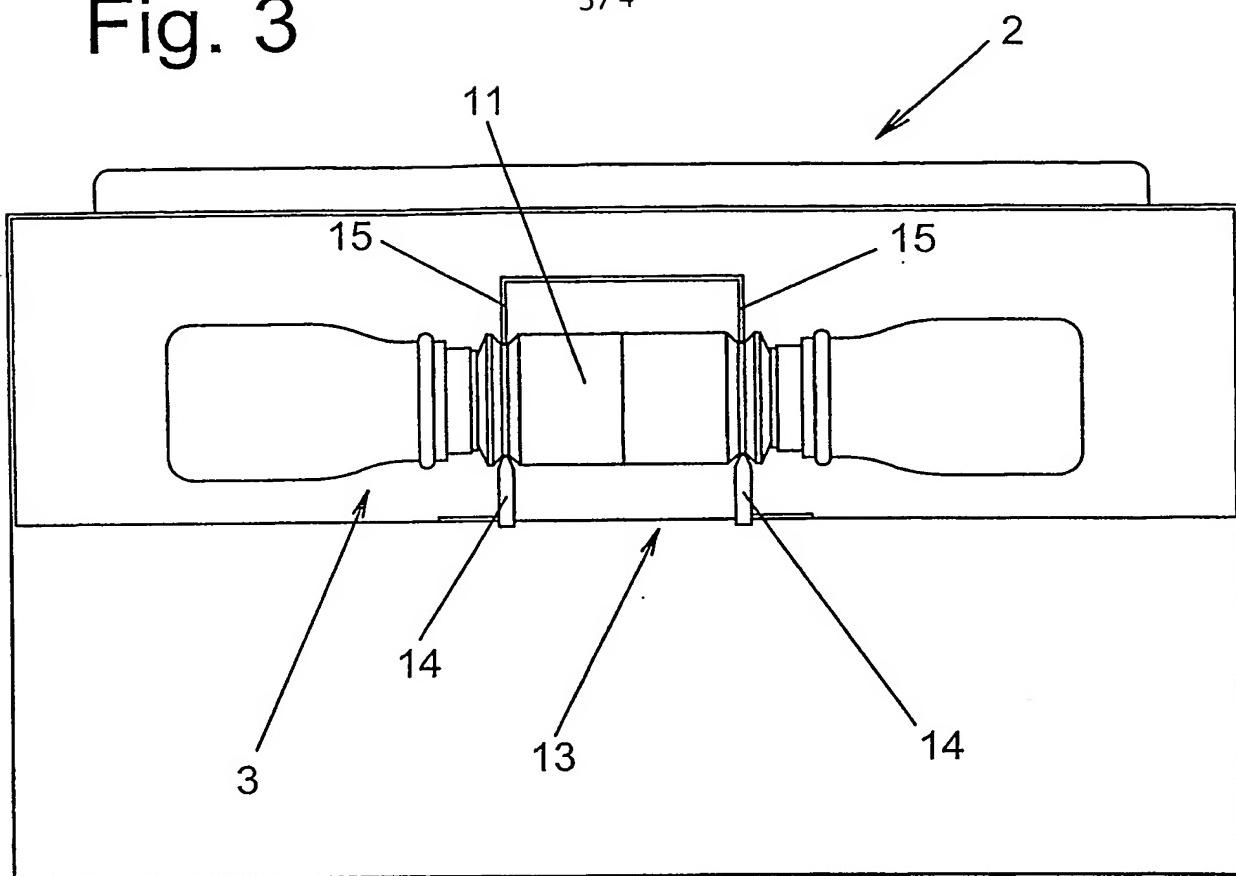
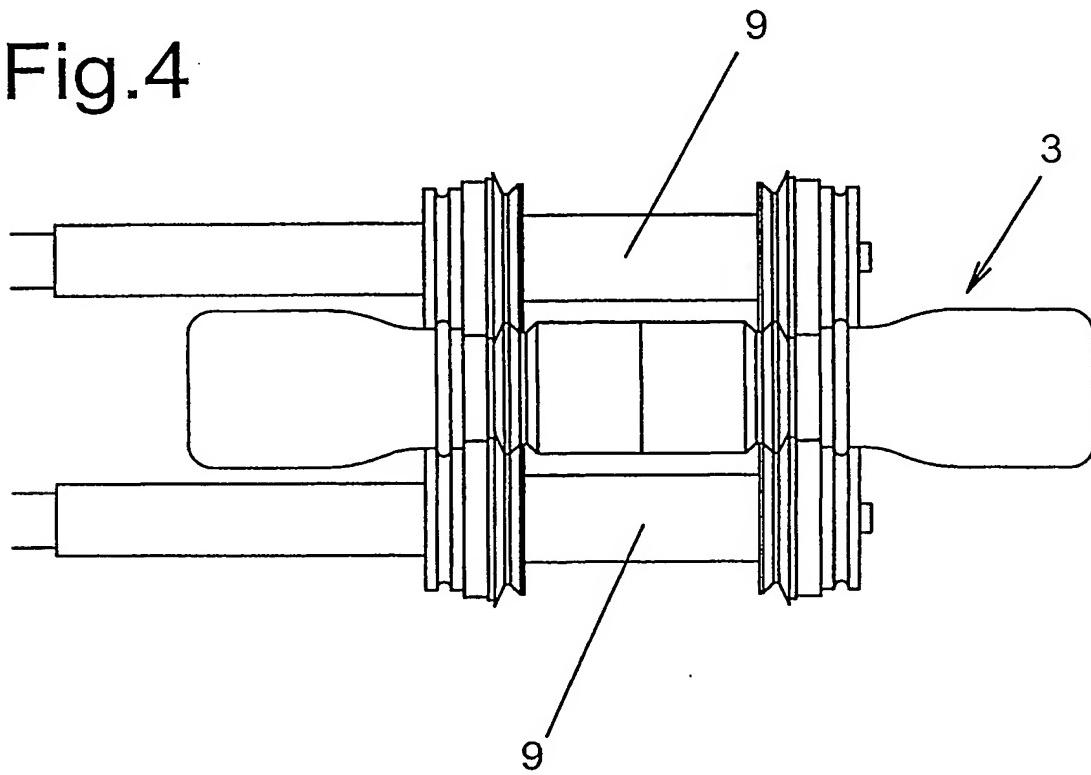


Fig. 4



4/4

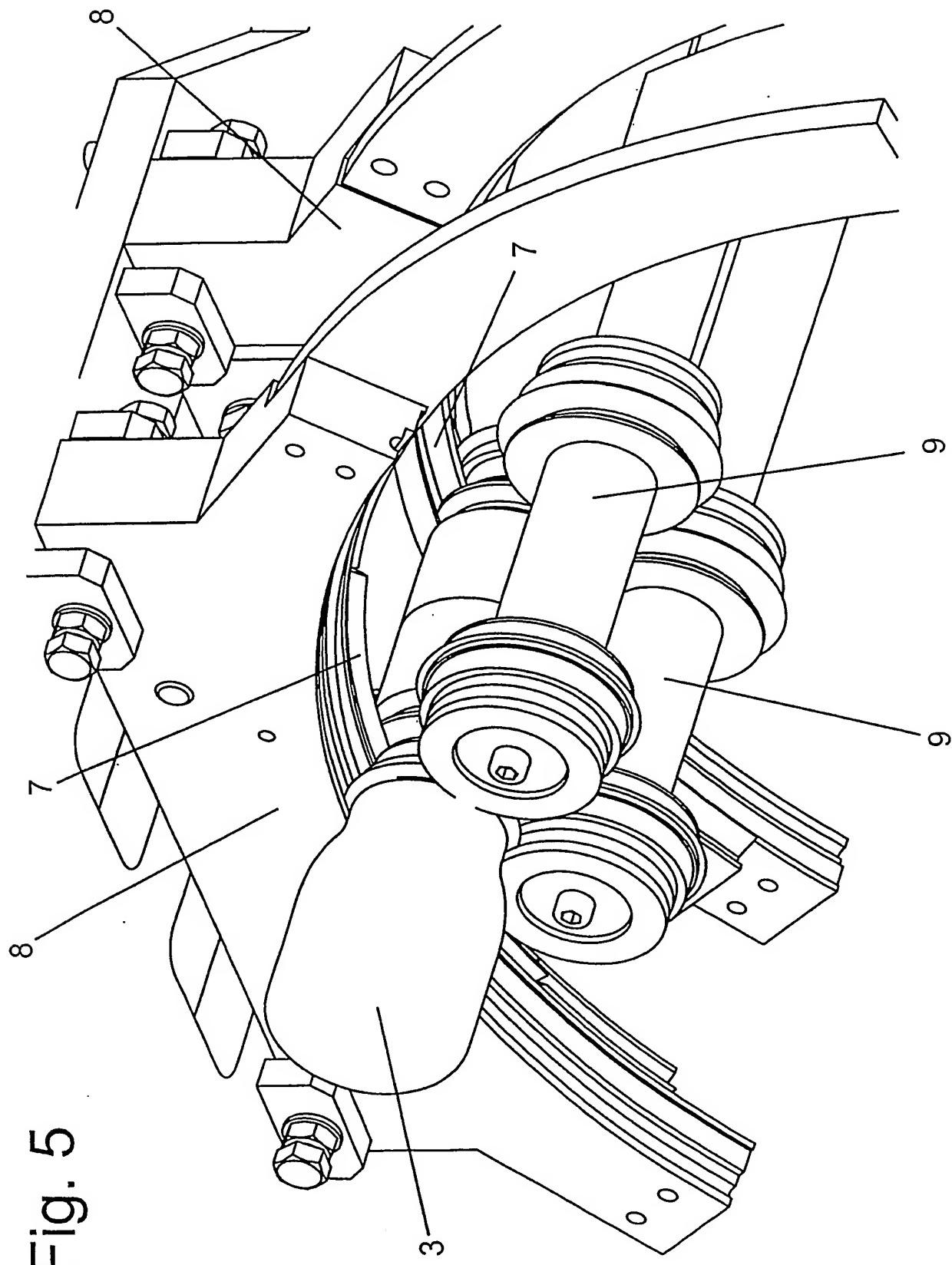


Fig. 5

INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB 03/04857

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B29C49/74 B26D3/16

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B29C B26D B23D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 448 648 A (SIXT MARTY E ET AL) 10 June 1969 (1969-06-10) column 4, line 49 - line 60; claims 1-4,11,12; figures	1-6
A	US 3 432 586 A (STENGER HANS G) 11 March 1969 (1969-03-11) column 1, line 48 - line 50; claim 9; figures column 2, line 23 - line 25 column 4, line 4 - line 16	1
A	US 3 862 698 A (HAFELE ROBERT X) 28 January 1975 (1975-01-28) column 3, line 7 - line 35; figure 2	1



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

30 January 2004

Date of mailing of the international search report

10/02/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Kosicki, T

INTERNATIONAL SEARCH REPORT

Information on patent family members

Final Application No

PCT/IB 03/04857

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 3448648	A 10-06-1969	NONE	
US 3432586	A 11-03-1969	NONE	
US 3862698	A 28-01-1975	CA 1014874 A1	02-08-1977